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ABSTRACT

This report discusses the growth of urbanization throughout the world with focus on the problems faced by poor city dwellers. The first section presents population data that show the great increases in urban populations around the globe during this century. Urban food supplies are discussed in the second section. Energy constraints on city growth are explored in the third section, with a discussion about differences in fuel use by urban and rural areas. The fourth section describes employment opportunities in cities and their influence on migration to urban areas. The final section of the report discusses a variety of strategies for managing urban growth. (MK)

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City Limits: Emerging Constraints on Urban Growth

Kathleen Newland

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Humankind is changing with breathtaking speed into an urban species. The population of the world's cities has doubled in the past 30 years, to 1.8 billion, so that four out of every ten people alive are urban residents. United Nations demographers characterize the movement to the cities as "the greatest mass migration in human history." If their projections materialize, more than half the world's people will be living in cities in 20 years' time.[1]

From a biological viewpoint, urban living appears profoundly unnatural. Demographer Kingsley Davis wrote, "The city differs from a beehive or a termite mound; it is not a habitat harmoniously adapted to the organic drives and reflexes of the species, but rather an alien environment precariously rigged so as to avoid disastrous consequences that would otherwise occur."[2] Humans evolved as a social species, it is true, but in small, dispersed groups ranging over wide territories. The population density found in cities presents dangers to human health, in the form of epidemics, waterborne diseases, and the concentration of wastes. Overcoming these dangers has required both ingenuity and substantial investment.

But if the city is an alien environment for the human organism, it is clearly the natural habitat for human culture. A disproportionately large number of humanity's great achievements in science, letters, music, painting, law, architecture, and other manifestations of high culture have been accomplished in an urban setting. And despite the biological odds against it, people have found ways to thrive in cities.

The historical perspective is not as comforting as might be thought, however. Some great cities have collapsed under their own weight, though the precise mechanism of their undoing remains mysterious. Furthermore, the successful cities of the past are poor guides to the

I wish to thank Ann Thrupp for her assistance with the research for this paper, and Lester Brown and David Satterthwaite for their reviews of the manuscript.

cities of the future. Both the scale and the context of urbanization have changed so dramatically in this century that they impose a basic discontinuity with the slow buildup of the past.

6 Three conditions distinguish the growth of cities today from past experience. One is the hugely expanded population base that forms the backdrop to current urbanization trends, particularly in the Third World. A second, related condition is the unfolding of an era of severe resource constraints; the skyrocketing price of oil is the most dramatic evidence of this. The third element of discontinuity with the past is the prevalence of capital-intensive technology in both industry and agriculture, which has severed the link between increased production and expanded employment. All three conditions have a profound impact on the size and the functioning of modern cities, and raise questions about their long-term viability.[3]

The trend of the past 30 years has been toward larger and larger metropolitan agglomerations, with an increasing concentration of people in the largest centers. In 1950 the combined population of all the "giant cities"—those with five million or more residents—was 47 million. In 1980, the giant cities are home to 252 million people, a figure that the United Nations projects will reach 650 million by the year 2000.[4] Concern for the urban future centers on the prospects for these huge cities, where all the attendant problems of urban life are magnified. Among these giants, the poor cities in the developing countries face the most serious difficulties in providing people with a decent level of living, so it is on their problems that this discussion will focus.

The number of Third World city dwellers grew, in the third quarter of this century, by 400 million. The final quarter's increment is expected to be nearly three times that size.[5] We are only just beginning to digest the impact of the last 30 years of unprecedented urban growth. Congestion, pollution, stark extremes of wealth and poverty, exploitation of rural lands and people for the benefit of cities—all are among the challenges that the new era of city life presents. As we face the staggering implications of the additions projected for cities over the next 20 years, it becomes clear that urbanization on the scale and at the pace anticipated is a costly, inefficient, and perhaps unsustainable process.

"What makes urbanization today historically unique is the sheer size of the global population."

Current Trends in Urbanization

Big cities have become so dominant a factor in modern life that it is hard to keep in mind how recent a phenomenon they are. The city of five million people did not even exist until the dawn of this century, when London reached that size. By mid-century, six cities each were home to at least five million. Today there are 26 cities that large or larger, and the United Nations predicts that there will be 60 by the year 2000. Bertrand Renaud of the World Bank's Urban Economics Division has noted among planners and administrators "a sense of concern that some cities are entering into the unknown and reaching population levels new to urban policymaking."[6]

As cities have increased in absolute size, they have also increased their share of the world's population. In 1920, only 14 percent of global population lived in urban areas. In 1980, 41 percent of the world lives in cities. By the year 2000, if this trend continues, the world will have an urban majority amounting to 3.2 billion people. Already, most countries are predominantly urban. The current global figure for urbanization is greatly affected by the figures for the giant countries of Asia—Bangladesh, China, India, Indonesia, and Pakistan —that have low urbanization levels and, between them, nearly half the world's population.[7] (See Table 1.)

Current urbanization rates—measuring the proportional shift of people from rural to urban residence—are not extraordinarily high by historical standards, even in the less developed countries. The most recent global calculations date from 1960: in that year, only six out of every 1,000 rural people in the Third World moved to a city.[8] Nor are the rates accelerating. What makes urbanization today historically unique is the sheer size of the global population. Today, a mere 1 percent shift of the world's population from the countryside to the city represents 44 million people—three new Shanghais, or five new Calcuttas. The number involved in that 1 percent grows day by day.

When the industrial countries of Europe and North America were becoming urban nations, their rural areas lost population. With the

Table 1: Urban Population as Proportion of Total Population, By Region, 1980

Region	Proportion of Population Living in Urban Areas*
	(percent)
North America	74
Oceania	71
Europe	69
USSR	62
Latin America	61
Asia	27
Africa	26
Less Developed Countries	29
More Developed Countries	69
World	39**

*The definition of an urban area varies from country to country. The regional averages used in this table are based on national figures for urban population as defined by individual countries.

**This figure is slightly lower than the UN/World Bank figure of 41 percent used elsewhere in this paper.

Source: Population Reference Bureau.

help of improved agricultural technology to increase productivity, the smaller rural population could still increase food production and thus feed the growing cities. It is easy to romanticize the past and exaggerate the ease with which the urban transition took place in Europe and America. In fact, human misery was a major product of the early industrial cities. Their growth proceeded at a relatively orderly pace partly because death rates were so high. For example, the average life expectancy among the laboring classes in Manchester, England, in 1842 was reported to be 17 years, owing to a staggeringly high infant mortality rate. Well into the nineteenth century, more people died in London than were born there. The city's growth was sustained only by massive migration from the countryside. In 1858, a year before the construction of the sewer system began, 20,000 Londoners died of cholera. Kipling's "packed and pestilential town"

—Calcutta—could as easily have been early nineteenth-century London.[9]

Cities in developing countries today exist in a demographic context that differs markedly from that of the Industrial Revolution. With urbanization proceeding on a rapidly expanding demographic base, the growing cities do not necessarily relieve population pressure in the countryside. High rates of natural increase (that is, the excess of births over deaths) permit urban and rural growth to proceed simultaneously. Given current growth rates, for example, Mexico's rural population is expected to double in 36 years and its urban population in less than 14. Between 1950 and 1975, the cities of the Third World expanded by 188 percent—but their rural populations also grew, by 49 percent.[10]

The phenomenal growth of urban population today is fueled by two major forces: natural increase and migration. Contrary to the image of urban growth as the product of peasants streaming into the world's favelas and bustees, however, in some cities natural increase is more important than migration in swelling the number of residents. Demographer Samuel Preston, examining data from 29 developing countries with statistics complete enough to allow analysis, concluded that roughly 60 percent of urban growth in those countries was derived from the excess of births over deaths within city populations. The remaining four out of ten new city dwellers were migrants. Natural increase was found to be the most important factor in urban growth in Latin America, the Indian subcontinent, and Southeast Asia. In sub-Saharan Africa, where most of the cities are relatively small but growing very rapidly, migration from rural areas is the predominant influence on city growth.[11] (See Table 2.)

Yet even in those countries where natural increase is the major source of urban growth, migration makes a heavy contribution as well. For outside observers, it is often hard to believe that conditions in urban areas represent an improvement over life in the countryside. From one-fourth to one-half or even more of the people in many Third World cities live in slums. Urban poverty keeps few secrets, and even urban amenities—schools, clinics, sewer systems—often fail to delight the eye. Rural poverty, however, can be deceptive, set as it often is among emerald rice fields, majestic mountain peaks, or exotic forests.

Table 2: Sources of Urban Growth, 1970-75

10 Country	Annual Urban Growth	Share of Growth Due to Migration	Share of Growth Due to Natural Increase
		(percent)	
Papua-N. Guinea	10.1	74	26
Kuwait	8.2	24	76
Yemen Arab Rep.	8.0	76	24
Tanzania	7.5	64	36
Nigeria	7.0	64	36
Colombia	4.9	43	57
Mexico	4.6	23	77
Brazil	4.5	36	64
Venezuela	3.9	21	79
Argentina	2.0	35	65
Thailand	5.3	45	55
Philippines	4.8	42	58
Indonesia	4.7	49	51
Sri Lanka	4.3	61	39
India	3.8	45	55

Source: Bertrand Renaud.

But make no mistake: people migrate to the cities because, all things considered, they expect to be better off there. And they have ample evidence for this belief.

The distribution of the benefits associated with modernization is overwhelmingly slanted toward the cities. Medical and educational facilities, water and sewer systems, electrical service, cultural institutions, and so forth are many times more available to urban than to rural residents. The chief pull from the countryside, however, is not urban amenities but the urban economy. Average income in the city tends to be two, three, or four times as high as the rural average. The pattern of urban privilege is established and reinforced by the heavy

"The chief pull from the countryside is not urban amenities but the urban economy."

concentration of public investment in urban areas. As long as that imbalance prevails, cities will continue to grow out of control, and the goal of improving the quality of life for their residents will remain out of reach.

Urban Food Supplies

People who live in cities cannot live off the land. Urban densities are far higher than the natural carrying capacity of the urban environment. One of the most basic distinguishing characteristics of cities is that their residents depend on food surpluses produced elsewhere. Cities did not—could not—come into existence until agricultural advances such as irrigation and the use of draft animals made it possible for farmers to grow more food than they needed for themselves. Political and economic systems then slowly evolved that were capable of persuading or forcing rural people to produce a surplus and make it available to the cities. Some cities supported themselves by simple extortion of taxes or tribute, operating a sort of protection racket at the peasants' expense. Others produced and sold manufactured goods or acted as intermediaries in food trade. And some cities offered services such as education, religious ceremony, or physical protection from marauding bandits, armies, and neighbors.

Urban size has traditionally been constrained by the city's ability to draw on a surrounding area for its basic provisions. But in modern times, motorized transportation has offset the effect of distance, and as a result the whole globe acts as a larder for the world's cities. Access to food surpluses is now determined more by financial resources than by political domination—though politics certainly plays a part in world food allocation, as the 1980 U.S. embargo on grain sales to the Soviet Union attests.

Increasingly, the agricultural surplus that feeds most cities comes not from the surrounding countryside but from foreign countries. Reliance on imported food grain has increased in tandem with urbanization. The fastest-growing cities today are in countries whose rural populations are also growing steadily; local agricultural advances are hard-pressed even to keep up with rural food needs, much less to supply the rapidly multiplying urban population. In some areas, agri-

cultural productivity is actually falling as a result of soil erosion, soil salinity, waterlogging, or other forms of degradation. The gap between domestic production and consumption requirements leaves these cities dependent on food imports.

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While the list of countries unable to feed themselves grows, the number of countries that produce exportable surpluses has dwindled. Lester Brown notes that "those [countries] remaining as important exporters at the global level can be numbered on the fingers of one hand. While scores of new importers have emerged over the past two decades, not a single new exporter has emerged." Countries as diverse as Belgium, Libya, Senegal, and Venezuela depend on imports for over half of their grain supply. On a regional basis, only North America and Oceania (Australia and New Zealand) export grain; Africa, Asia, Latin America, and Europe are net importers.[12]

Brown foresees the day when the combined demand for food from the more than 100 importing nations will exceed available supplies from the handful of exporters, forcing governments that control any surplus to make difficult choices among nations bidding for grain. That day could be hastened by a string of bad harvests in North America or by the emergence of new demands on cropland. Among the latter, large-scale conversion of grain into alcohol fuel could considerably reduce the quantity of food grain available for export if it is seriously pursued as a solution to the problem of dependence on imported oil. As Brown says, "the hostages in this game are the cities of the world that are sustained with imported food. They are living quite literally from ship to mouth."[13]

Napoleon learned the hard way about the dangers of long supply lines, as his armies shivered and starved on the Russian plains. The world's cities are in a position of extraordinary vulnerability because of their dependence on faraway food sources. In many cases, the inadequacy of supplies closer to home is not simply the product of a rural population outstripping the productive capacity of arable land. It is, rather, a reflection of the low priority given to agriculture in national development plans and of pricing and investment policies that handicap farmers in order to bolster urban-based industrial development. Algeria, for example, announced a major new commitment to rural development in its 1980 development plan, yet the

"The world's cities are in a position of extraordinary vulnerability because of their dependence on faraway food sources."

government is still devoting only 12 percent of public investment to the agricultural sector. In the 18 years since independence, this rapidly urbanizing country has seen its reliance on imported food rise from 30 percent to 70 percent of national consumption.[14]

The reliance on faraway food supplies is expensive in the short run, if not disastrous in the long run. New Yorkers pay 15¢—about one-third the total price—just to transport a head of lettuce from California. Shipping 55 million lettuces cross-country to New York City in 1978 used up 140,000 barrels of diesel oil. For the rich urbanite, such additional costs are a mere nuisance. But for the poor they can define the boundary between an adequate diet and malnutrition. The costs of transporting, distributing, and marketing food in cities often brings the price above the level that allows the urban poor to meet minimum standards of food consumption. Surveys of food prices in Indonesia, Mexico, Pakistan, Tanzania, and Tunisia show that city dwellers pay between 10 and 30 percent more for their food than people in the countryside do.[15]

The dependence of cities on distant sources of food is aggravated by the steady conversion of nearby farmland to nonagricultural uses. The kind of land best suited to farming—level, accessible, well-watered—is also the most desirable for residential or industrial use. The loss of agricultural land to urban sprawl is a problem in the vicinity of most large cities, from New York to Seoul to Cairo. The U.S. Department of Agriculture estimates that over 2.5 million hectares of top-quality U.S. farmland were lost to urban sprawl between 1967 and 1975. Assuming only average productivity for the lost hectares, this represents the food supply of roughly 8.4 million Americans. Egypt, which has a much smaller cropland base and a rapidly growing population, may be losing 26,000 hectares a year of its best land to the encroachment of cities, roads, factories, and so forth. On a global basis, the loss of cropland to urbanization makes a relatively small dent in the world's cropland base. But it does, inevitably, lengthen the supply lines of cities, thereby raising the price urban dwellers pay for food.[16]

Urban incomes are, on the average, much higher than rural incomes, so that higher food prices could be expected to present no major difficulty. Income distribution within cities can be highly skewed,

however, and those at the bottom end of the scale have serious problems getting enough food. The U.N. Food and Agriculture Organization, in its 1977 *World Food Survey*, reports that among the lowest-income groups "urban dwellers have calorie availability of about 300-400 calories less than the rural inhabitants, yielding levels close to, or below, those regarded as the minimum if nutritional deprivation is to be avoided."[17]

Part of the reason that the urban poor eat less well than the rural poor is that opportunities for city dwellers to grow much of their own food are severely limited. Typically, people who live in cities produce only a small fraction of what they consume. (See Table 3.)

Table 3: Average Calorie Consumption in Tunisia and Brazil and Proportion of Food Produced by Consumers for Own Use

Country		Food Availability	Proportion of Food Produced by Consumers for Their Own Use
		(calories per person)	(percent)
Tunisia, 1975			
	Rural	2,474	37
	Urban	2,228	9
	Big Cities	2,122	2
Brazil (selected regions), 1974/75			
Region 1:			
	Rural	2,191	26
	Urban	2,108	8
	Rio de Janeiro	2,128	4
Region 3:			
	Rural	2,548	50
	Urban	2,256	13
	Porto Alegre	2,306	7
	Curitiba	2,157	8

Source: Food and Agriculture Organization.

Their nutrition depends on sufficient food being available in the marketplace at prices they can afford. The urban poor are thus particularly susceptible to the vicissitudes of the commercial food system. They must pay for its inefficiencies in the storage, handling, processing, and promotion of different commodities. And what the marketing system chooses to provide because it is profitable is often inappropriate: too expensive (commercial baby foods), too highly processed (white bread), or of dubious nutritional value (soft drinks).

According to the United Nations, five out of every six urban families in India live on $50 a month or less. At this income level, which is practically middle class in a country where per capita income nationwide is only $180 a year, families typically spend 70 percent of their income on food. Budgets of people at lower income levels are even more heavily dominated by food. They can ill afford the multiple transaction costs that are built into the urban food supply. A recent World Bank study states that as many as 360 million people in the cities of the developing world suffer chronic calorie deficits. There are many more undernourished people in the rural areas, but the incidence of malnutrition is growing more rapidly in cities than in the countryside. Furthermore, the degree of malnutrition is frequently more severe among city dwellers, and starts taking its toll at earlier ages.[18]

With neither the land to produce their own food nor the buying power to secure an adequate supply of purchased food, the urban poor have little ability to adjust to rising food prices. And the urban poor are rapidly becoming the urban majority. By the year 2000, 12 of the world's 15 largest cities will be Third World cities.[19] In most, the shantytowns that house the poor are growing two or three times as fast as the cities of which they are a part. The precarious state of their inhabitants' food supply is a cloud over the urban future.

Energy Constraints on City Growth

The city is a constructed environment, and energy is one of its most fundamental building blocks. The breakthroughs in agricultural productivity that permitted the initial rise of cities in effect allowed

people to capture more of the sun's energy for human use. For much of history people had to rely entirely on solar-derived forms of energy—chiefly human energy from crops, animal energy from pastures, and heat from the combustion of wood, supplemented by a bit of sun-driven wind and water power. As long as these were the major energy sources, cities remained a minor feature of the map of human geography. On the eve of the Industrial Revolution, less than 3 percent of the world's population lived in cities.[20]

The force that gave real impetus to urban growth was the harnessing of fossil fuels. Its impact was two-fold. As the foundation of modern industry, fossil fuels underwrote the demand for large numbers of workers to be concentrated in the new centers of economic activity. Secondly, fossil fuels permitted a quantum leap in agricultural labor productivity. Through the mechanization of agriculture, and later the application of fertilizers based on fossil fuels, fewer and fewer people were required to produce the agricultural surplus needed to feed the nonfarm population. The ultimate result of this process is that a mere 5 percent or so of the population actively engaged in farming can provide food for all the rest—as they do in the United States, for example. This high level of labor productivity in agriculture rests on the use of vast amounts of energy.

Fossil fuels have thus worked at both ends of the urbanization process to speed the transition: drawing workers to industry and releasing them from the land. They have also powered the vast transportation networks that feed the industrial centers literally and metaphorically—bringing in food, workers, and raw materials—and that carry their products to far-flung markets. The transportation costs of supporting cities are huge. High energy use begets high energy use. For example, 44 percent of all rail cargo in Britain are coal and coke that are being transported from the mine to their point of use. In the U.S. food system, only one-fourth of the energy burned actually goes into food production. The other three-fourths is used to transport, process, and distribute the food after it leaves the farm.[21]

In developing countries, direct household energy consumption, as opposed to energy for industry or commercial transport, amounts to roughly half the total energy consumed. The problems of household energy supply for city dwellers are somewhat analogous to the prob-

wood is a major fuel and little has been done to protect this renewable resource. In an age of rising prices for all widely used fuels, Mbi states unequivocally that "the greatest problems are currently being faced by that segment of the urban population that relies on wood for fuel."[24]

As the cost of firewood has risen to reflect its declining availability, the cost of most alternatives to wood has gone up too. Kerosene is one of the most popular and practical substitutes. It is easily transported and suitable for small-scale usage, and its use does not require a large investment in equipment or installation. The price of kerosene, however, depends on the price of crude oil. Despite the heavy subsidies that many countries apply to kerosene, in several non-oil-producing countries the price has moved well beyond the financial reach of many of the urban poor. (See Table 4.)

Table 4: Price of Kerosene in Selected Countries, 1972 and 1976

Country	1972	1976
	(cents/gallon)	
Brazil	32	75
Colombia	13	20
El Salvador	18	48
Ghana	23	87
India	31	55
Kenya	33	64
Pakistan	16	33
Philippines	14	54
Sri Lanka	14	47
Thailand	34	54

Source: Elizabeth Cecelski, Joy Dunkerley, and William Ramsey.

Because urban residents generally have higher average incomes than people who live in the countryside, they might be expected to use more energy, on the average. Among the lower income groups, however, this is not the case, even though the urban poor are richer, in

"In many Third World cities,
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lems of urban food supply. It is very difficult, with current technology, for urbanites to be self-sufficient in energy. As with food, their supplies must come either from the surrounding countryside, in the form of traditional fuels such as firewood and charcoal, or from imports. Only cities that are located in countries with abundant indigenous fuel resources bear this burden lightly. And even they cannot be completely sheltered from the world market price for fossil fuels, which sets the opportunity cost for their fuel if not the direct cost.

In many Third World cities, the poor continue to rely on the surrounding countryside for their fuel needs, with devastating results for the natural environment. It is estimated that the urban poor use traditional sources for 80 percent of their energy consumption.[22] The most important of these are wood and charcoal, followed by crop and animal wastes. They are often referred to as "noncommercial" fuels, a somewhat misleading label since the traditional fuels are often bought and sold. But it does serve to distinguish them from such fuels as kerosene, electricity, coke, and gas that normally can be obtained only through commercial channels.

Large cities whose residents depend heavily on wood and charcoal find themselves at the center of an expanding circle of forest devastation. A study by the U.S. Agency for International Development reports that firewood cannot be found within 70 kilometers of Niamey in Niger or of Ouagadougou in Upper Volta.[23] As the forests recede from the population centers, it eventually becomes impractical for the poor to gather firewood for themselves; the treks into the countryside become so long that they do not repay the effort. Consumers are then forced either to buy their wood or charcoal from commercial providers, who spread the ecological damage by exploiting more distant forests, or to switch to other fuels such as kerosene or bottled gas.

The depletion of accessible forests has sent the price of firewood soaring, and in some areas it has lost the price advantage it traditionally had. Emmanuel Mbi of the World Bank found that in Cameroon the price of firewood in the cities more than doubled between 1972 and 1977, while the price of charcoal nearly tripled. Similar increases have been observed in other parts of the world where

monetary terms, than the rural poor. Two factors explain this counterintuitive observation. One is price: the traditional fuels used largely by the poor are more expensive in urban areas because, as discussed earlier, demand is overtaking local supply. In rural areas people seldom have to spend cash for traditional fuels. They may have to expend huge quantities of their own labor, but this is always available to them even when it brings very low returns. People in cities, on the other hand, are much more limited in their ability to provide their own fuel, and they may not have cash to purchase fuel when they need it. Thus, they use less energy.

A second important factor in explaining the relatively low energy consumption of the urban poor is their more efficient use of the energy they do burn. The commercial fuels that poor people in cities consume are easier to use efficiently than the traditional fuels that are used almost exclusively in rural areas. An open fire used for cooking extracts only 10 percent of the energy content of the fuel. And a kerosene stove is four times as efficient in its use of energy as a wood stove. Since cooking typically accounts for 50 to 60 percent of a poor household's energy budget, this kind of improvement in efficiency can do a great deal to lower overall energy consumption. As people shift to commerical energy sources, they use less fuel but get more out of it. Even though many city dwellers still rely entirely on traditional fuels, a more efficient mixture of energy sources prevails in urban than in rural areas.[25]

The price paid for the greater energy efficiency in cities is often a high one: increased dependence on expensive, imported fuel. This has become a critical problem for the two-thirds of the developing countries that are oil importers, as it drains their foreign exchange reserves and siphons off funds from other needs. Yet a return to the use of noncommercial fuels in cities is not a practical alternative. Traditional gathering practices are already exacting an unacceptably high toll in the form of ecological deterioration.

Rapidly urbanizing poor countries are being squeezed between the skyrocketing prices of imported fuel and the spiraling real costs of using traditional fuels in an urban energy system. Some alternative energy systems that were recently thought to have great potential have since revealed their flaws. Nuclear power, for example, has all

but run aground in many regions, owing to unresolved problems connected with waste disposal, security, and, in particular, mounting costs. Countries that have substantial indigenous coal reserves are turning to a greater use of coal as a substitute for imported oil, and are likely to increase their reliance on it. But burning coal on a scale massive enough to break the worldwide dependence on petroleum presents serious pollution problems involving not only smoke and dust but also the long-term buildup of carbon dioxide in the atmosphere.

A more promising set of alternatives for future energy supplies consists of various solar techniques, ranging from solar heat collection and the direct conversion of sunlight to electricity to such indirect forms as wind power, water power, wood, and other biological fuels. In some of these cases, especially the last, there is nothing new—except a new and urgent need to employ them widely and efficiently. But most solar sources are best used in small, decentralized energy systems. Lester Brown argues that "if the world goes solar, the optimum size of human settlements is likely to be far smaller than it would otherwise be."[26] The attractiveness, both environmentally and economically, of solar energy as the fuel source of the post-petroleum age is a powerful incentive to resist the further concentration of population in huge cities.

Location of Employment

The single most important influence on urban development has been the nature and location of employment. The availability of jobs is also, arguably, the most important element in the quality of city life. Much of the debate about the urban condition focuses on the supply of services such as piped water, waste disposal, transportation, and housing. Although provision of these services can vastly improve the well-being of the poor, it does not solve their basic problem, which is poverty. Productive employment does.

The challenge of assuring employment for the growing labor forces of the developing countries is a formidable one. Between now and the

end of the century, more than 625 million people will be added to their work forces, at a conservative estimate. They will join over 300 million who are currently unemployed or underemployed. The majority of these people are expected to look for work in the cities, some because they will be born there and the rest because they will leave their rural homes out of frustration at the chances of making an adequate living in the countryside.[27]

Empirical studies consistently support the idea that most people who migrate to the cities do so because they believe economic opportunities will be better there than in the rural areas or small towns from which they come. In a 1971 survey in the three major cities of Sudan, for example, three-quarters of the migrants said they had moved in order to find a job. And indeed, well-paid, steady jobs in the formal sector are heavily concentrated in the cities. In 1974, Bogota and Medellin between them had fully half of Colombia's industrial jobs. Nairobi was the site of a similar proportion of Kenya's wage employment in manufacturing in 1977. People who aspire to this kind of job have little choice but to move to the city.[28]

The extrapolation of Western historical experience to the Third World has led policymakers to regard the manufacturing sector, and hence the cities that grow up around it, as the engine of economic growth. But faith in industrial growth as a cure for unemployment has proved to be an illusion for many. Although some developing countries have achieved impressive rates of industrial growth, almost none have solved their employment problems. For Asia as a whole, the index of manufacturing output registered a healthy gain of 247 percent between 1955 and 1966. But the index of manufacturing employment rose only 71 percent in that period, which means that each unit required considerably less labor to produce than previously.[29] At this rate, the developing countries must keep going faster and faster to stay in the same place.

The modern industrial sector in Third World countries relies heavily on imported technologies that emphasize capital and energy over human labor. The historical pattern, in which industrial growth was limited by the amount of labor that could be pulled to the cities by the lure of jobs, has changed dramatically. Modern industries in the Third World today can absorb only a small fraction of the rural

exodus. The oil industry in Venezuela provides one example: it is the mainstay of the national economy, but employs only 0.5 percent of Venezuela's labor force. In another oil-producing country, Nigeria, the growth of total modern-sector employment during the sixties was 1.5 percent a year—at a time when the urban labor force was growing by 6 percent a year.[30]

The slow growth of industrial employment reflects the high cost of creating jobs in modern, capital-intensive industries. Colin Norman estimates the average cost of creating one industrial workplace in the United States at $20,000, and the cost may be higher still in countries where the basic manufacturing infrastructure is not well-developed. In the black areas of the province of Natal, South Africa (designated by the South African Government as the African "homeland" of KwaZulu), the creation of 2,500 jobs in 30 industrial enterprises required an investment of nearly $33,000 per job. Clearly, with this kind of capital needed, poor countries with rapidly growing populations cannot realistically expect industry to absorb more than a small fraction of their labor-force growth. In the 1978-83 Indian Five-Year Plan, the optimistically projected industrial growth rate of 5 percent would absorb only 10 percent of the people who will join the labor force during this period.[31]

The economic policies of governments seem to conspire to reduce the labor-absorbing capacity of industry. Investment tax credits encourage manufacturers to put their money in labor-saving equipment. Overvalued currencies artificially reduce the cost of importing such equipment and materials that are not locally produced. Large firms get preferential treatment over small enterprises in credit markets and pay lower interest rates for their loans. Bulk consumers of power pay lower utility rates than small-scale users. And high trade barriers designed to protect against competition from imported goods make it possible for inefficient producers to survive without improving their performance. Labor legislation sometimes makes people more expensive to hire than machines. All of the above encourage the substitution of capital and energy for labor. Much has been written but little has been done about the inappropriateness of such policies for the labor-rich, capital-short, energy-starved economies of the developing world.

Despite the low absorption of labor by industry, the overt unemployment rates in Third World cities tend to be low. The urban poor, unprotected by social security or employment insurance schemes, simply cannot afford to be jobless. They must find or create some kind of work, no matter how undesirable. Their ingenuity in inventing jobs commands admiration. Self-employed workers account for more than 40 percent of the working poor in Lima, Bangkok, and the cities of Malaysia. Their problem is not unemployment as such, but, rather, extremely low productivity and earnings. Too often their work does not create wealth, but merely serves to distribute it more thinly.[32]

The informal sector of the urban economy has become by default a major source of jobs for workers who are left out of the modern, formal sector. It accounts for between one-third and one-half of all employment in such cities as Jakarta, Sao Paulo, Lagos, and Calcutta —indeed, in most Third World cities.[33]

One of the main characteristics of this informal sector is the substitution of human labor for energy and capital: domestic servants substitute for household appliances, cycle rickshas take the place of motor taxis, local building materials take the place of steel and concrete, intensive repair and recycling activities take the place of new production of manufactured goods and raw materials. The labor-intensiveness of the informal sector provides a far better match for the resources of developing countries than the large-scale industrial sector does. Yet it is often hamstrung by inappropriate restrictions—licensing procedures, production standards, price controls, zoning regulations, and so forth. Nevertheless, for a large portion of the poor urban population, particularly the unskilled, the informal sector offers the best chance for employment.

Urban labor markets are intimately connected to rural ones, with migration as the link. Modern communications and transportation networks give people in cities and those in the countryside access to quite accurate information about employment prospects and living conditions in each other's place of residence. In theory, migration performs a balancing act between the two, but so far the shift of population has been overwhelmingly in one direction. The expectations of rural migrants are encouraged by average income levels in

the cities that are typically three or four times higher than those in the countryside. In the face of rural stagnation, and even though the income of many city residents falls far short of the average, migration represents a perfectly rational decision—or at least a reasonable risk.

Strategies for Managing Urban Growth

Many planners and policymakers seem to regard urbanization as an irresistible force of nature, and to regard themselves as powerless to alter its course. Furthermore, the historical association in the West between industrialization, urbanization, and economic development has generated a certain complacency in the face of rapid city-growth. Many argue that economic expansion and the "take-off" into self-sustaining prosperity depend on rapid industrialization, and that this in turn depends on the economies of scale that cities offer. This theory, which leaves it to the economic equivalent of gravity to spread the benefits of industrialization to the rural masses, has been largely discredited. Yet its impact lingers on.

Economic theory still relies too heavily on economic history. It supposes that the development of the Third World, and the role of cities there, will be a replica of Western industrial development. There are many reasons to believe otherwise. Prominent among them are the three constraints discussed: food, energy, and employment. In these three areas, circumstances have changed enough to justify Henry Ford's assertion—"History is more or less bunk."

In the essentially backward-looking theories of urban development, rural-to-urban migration is assumed to be a self-correcting process. People move to the cities because they confidently expect to be better off, and they usually are. If they did not benefit from the move they would stay put. Once the standard of living declines in the cities under the weight of migration, so the theory goes, the incentive to leave the countryside will disappear. In the meantime, why discourage people from moving? The question itself relies too heavily on relative judgments. The tendency for people to escape from rural destitution to only slightly less extreme urban destitution is hardly a constructive basis for a human settlements policy.

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The reasons behind the serious concern over the rapid growth of cities fall into three major categories. First, in many instances the concentration of people in cities clearly does not bring about an optimal distribution of a country's resources. National output would be higher and its level more stable in the long run if the cities grew more slowly and deliberately from a well-developed agricultural base. Michael Lipton, in his book *Why Poor People Stay Poor*, points out that in most poor countries investment in the agricultural sector brings higher returns—as much as three times higher—than investment in other parts of the economy does. Yet the urban economy gets the lion's share of both private and public investment. Lipton finds that, typically, no more than 20 to 30 percent of a country's capital is devoted to the agricultural sector, even though 70 percent of the population may live in rural areas. The long-term price of such a misallocation of resources is borne by the whole country—in the form of rural stagnation, urban overcrowding, and general poverty—but the short-term benefits of what Lipton calls "urban bias" accrue to the most articulate and powerful segments of society.[34]

The unsatisfactory quality of life in most cities is a second cause for concern. Most fast-growing cities in the developing countries are ringed with slums and shantytowns where many basic human needs go unmet. Lack of adequate housing is one of the most visible manifestations of urban poverty. One-third of Mexico City's families, and fully half of Calcutta's, live in one-room shelters scarcely worthy of the name.[35] It is a testament to the appalling quality of life in Calcutta's slums that many of the so-called pavement-dwellers who sleep on the city streets do so not because they are homeless but because the pavement is an improvement on their dwellings. Many of the shantytowns lack basic services such as clean water, sewage disposal, schools, clinics, and public transportation. Because they are growing so quickly—commonly by as much as 10 percent per year—the provision of services to slum areas falls further and further behind.

The third major worry about urbanization concerns the widening gap between city and countryside, which is capable of creating a schizophrenic society—one part modern, urban, and relatively affluent; another part traditional, rural, and poor. The threat to national integration is a real one. The rural-urban dichotomy has been des-

cribed by Michael Lipton as "the most important class conflict in the poor countries of the world today."[36]

The conflict has been exacerbated by economic policies that have attempted to squeeze from the agricultural sector a surplus that is in turn invested in industries that are of no benefit to rural people. This pattern can easily set in motion a vicious circle of rural stagnation. As long as any investable surplus is milked from agriculture and reinvested elsewhere, incomes in rural areas are likely to remain low. And as long as rural incomes remain low, rural demand for manufactured goods will be small, so industries will continue to be oriented toward the cities or toward foreign markets.

Reliance on imported food and energy reinforces the conflict of interest between rural and urban people. As noted earlier, food and energy imports are consumed chiefly in the cities. But the funds to pay for them are usually derived, directly or indirectly, from the countryside: directly, in the form of primary-product exports from the forests, farms, and plantations; indirectly, as manufactured exports produced in industries that are subsidized by the unwilling rural sector.

Such industries employ few Third World people even in the cities—rarely more than 5 or 10 percent of the urban population. Yet the few who are employed earn wages that are high enough, relative to the average income, that even the remote possibility of an industrial job exerts a powerful pull on people in the resource-starved rural sector. Thus, industrialization can encourage rural migration while contributing little to urban employment.

The corrective to this kind of distorted development pattern is straightforward, but far from simple. It lies in building industrialization literally from the ground up: that is, investing first in agriculture. A flourishing agricultural base can support a network of decentralized, labor-intensive industries that would process agricultural products and produce simple, affordable goods useful to small farmers. As agricultural profits generate new, indigenous markets for industrial goods, the people employed in these industries will generate a new market for foodstuffs—a reverse of the vicious circle of urban development depleting rural areas. There is, in other words, a powerful potential for complementarity between the rural and urban sec-

tors. But their progress must stay in balance and the benefits must be shared reasonably between them. If urban areas are consistently favored in national economic policies, people will quite sensibly flock to them. If rural incomes achieve parity with urban ones, the element of economic coercion in rural-to-urban migration will be largely removed.

Countries that must import petroleum to fill their energy needs are under great pressure to give priority to export products that can generate much-needed foreign exchange. The pressure to export intensified throughout the seventies as oil prices soared. In 1980, petroleum will account for close to one-half of India's and Tanzania's total import bills; Brazil will pay out more for oil and for the payments on earlier debts than it will take in through exports.[7] Earning the funds to pay for imported energy is an additional drain on rural development potential.

One way to weaken the stranglehold of energy-import bills is to make a major effort to develop indigenous, renewable power sources. Most of these are inherently decentralized; the benefits of developing and using them would therefore accrue chiefly to rural populations. People in the countryside might find work building and maintaining small-scale hydroelectric dams, fuel plantations, methane digesters, wind generators, fuel-alcohol distilleries, and so forth. The availability of low-cost power in the countryside would also enhance the economic viability of rural industries. These direct and indirect employment effects could be expected to reduce the pressure to migrate to the cities.

Even if rural migration were to end miraculously overnight, the cities of the Third World would have solved only about half the problem of rapid growth. The natural increase of urban populations would continue unimpeded. For this component of urban growth, family planning is the obvious corrective. It is easier to provide both information and services to an urban population than to a rural one. City dwellers tend to be more highly educated, to have more exposure to the mass media, to be closer to facilities that supply family planning services, and to have better access to public transportation. They are also less bound by traditions that mandate large numbers of children. All of

these factors would suggest a greater predisposition on the part of urban women and men to use family planning services.

It remains for governments to activate this predisposition by providing information and services to all potential users, but also—and equally important—by creating an economic and social climate in which it makes sense for individuals to limit the size of their families. If infant mortality remains high, if children are a parent's only form of social security, if productivity is so low that a family needs many hands to make ends meet, if women have no source of status and security other than childbearing, then birth rates will very likely remain high. All this applies equally to rural and urban areas. It is, however, somewhat easier for governments to structure incentives for small families in an urban setting. Both China and Singapore, for example, manipulate urban housing allotments, giving preference to families with only one or two children.

Population policy for cities cannot, of course, be seen in isolation. If urban levels of living were to rise because of a successful family planning effort while rural standards fell because of increasing population pressure, the imbalance would surely intensify rural out-migration. The same conundrum—that improvements in urban conditions accelerate migration to the city in a way that threatens any gains—applies to every area of urban policy, be it employment, services, or food and energy supplies.

If conditions in the countryside deteriorate for a large portion of the rural population, the threshold for migration to the city will sink. But there is hope in the converse of this equation: if rural standards of living can be generally raised—not just for the elite but for the mass of the people—the rural exodus can be stemmed. The growth of cities will not thereby grind to a halt. But with a judicious retreat from urban bias and a serious commitment to rural development, coupled with a sensible population policy, urban growth could proceed at a more deliberate and orderly pace. This is not an impossible ideal, though it has hardly been put to the test. The scale and the context of urbanization have changed almost beyond recognition. But it is still possible for the cities of the developing world to fulfill their historical potential—as real agents of national development.

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